

Patent claims

1. Electrical coil with cooling system,
whereby the cooling system comprises a heat dissipation device with a fluid (2)
5 and a tempered reservoir (6) of this fluid,
and whereby the coil (1)(3)(9) is coupled to the tempered reservoir (6) by means of
the fluid (2); and the reservoir (6) is temperature-regulated such that the
temperature as well as the pressure of the fluid (2) is kept in immediate proximity
of the critical point of the fluid (2).
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2. Electrical coil according to claim 1,
characterized in that
the coupling is formed via a tube (7) that conducts heat well, which tube contains
the fluid (2) and is situated in thermal contact (8) with the coil conductor (9) in that
15 it passes through the electrical coil.
3. Electrical coil according to claim 1,
characterized in that
the coupling comprises the conductor (1) of the electrical coil itself, in that this (1)
20 is fashioned tube-like and contains the fluid (2).
4. Electrical coil according to claim 1,
characterized in that
the coupling comprises a heat-insulating tube (4) inside (2) [sic] which the coil
25 conductor (3) is coaxially directed and which simultaneously contains the fluid (2).
5. Electrical coil according to any of the claims 1 through 4,
characterized in that
the critical temperature of the fluid (2) corresponds to approximately room
30 temperature.

6. Electrical coil according to any of the claims 1 through 5,
characterized in that
the fluid (2) is carbon dioxide or C_2F_6 .
- 5 7. Electrical coil according to any of the claims 1 through 6,
characterized in that
temperature and pressure of the fluid (2) in the reservoir (6) are kept in immediate
proximity of the critical point via a heat exchanger.
- 10 8. Gradient coil for a nuclear magnetic resonance tomography apparatus
with an electrical coil with cooling system according to any of the claims 1 through
7.
9. Gradient coil according to claim 8,
15 characterized in that
the coil is a transversal gradient coil.
10. Gradient coil according to claim 8,
characterized in that
20 the coil is an axial gradient coil.
11. Shim coil for an nuclear magnetic resonance tomography apparatus
with an electrical coil with cooling system according to any of the claims 1 through
7.
- 25 12. Nuclear magnetic resonance tomography apparatus with shim irons and
cooling system,
whereby the cooling system comprises a heat dissipation device with a fluid (2)
and a tempered reservoir (6) of this fluid (2),
30 and whereby the shim irons is [sic] coupled to the tempered reservoir (6) by means
of the fluid (2) and the reservoir (6) is temperature-regulated such that the

temperature as well as the pressure of the fluid (2) is kept in immediate proximity of the critical point of the fluid (2).

13. Nuclear magnetic resonance tomography apparatus according to claim 12,
5 characterized in that
the shim channels (13) are thermally coupled to a tube system (15) containing the fluid (2).

14. Nuclear magnetic resonance tomography apparatus according to any of the
10 claims 12 through 13,
characterized in that
the critical temperature of the fluid (2) approximately corresponds to room temperature.

15 15. Nuclear magnetic resonance tomography apparatus according to any of the
claims 12 through 14,
characterized in that
the fluid is carbon dioxide or C_2F_6 .

20 16. Nuclear magnetic resonance tomography apparatus according to any of the
claims 12 through 15,
characterized in that
the temperature and pressure of the fluid (2) in the reservoir (6) is [sic] kept in the immediate proximity of the critical point via a heat exchanger.

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